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SUBJECT: Comments on the L.E. Carpenter & Company Remedial Investigation (State-lead), Wharton, New Jersey

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General Comments

1) The nature and extent of chemicals floating on top of the water table have not been adequately defined in the Remedial Investigation. This floating product is a continuing source of groundwater contamination and should be one of the main subjects of the RI. No map is presented to show the extent of the floating product based on all available information. No complete chemical analyses of the floating product has been prepared as part of the RI study. The extent and the chemical make-up of the floating product must be well understood if an efficient and cost-effective remedy is to be selected.

The nature of the floating product has not been clearly defined in the RI. Page 36 of the RI states that TPH/Fingerprinting analysis of the sample of floating product taken from monitor well 11-s showed it to be a mixture of gasoline and lubricating oil. However, the progress reports that have been submitted to NJDEP refer to it as xylene. Are there more than one type of floating product at the site or do we not have a clear understanding of the chemicals that make up the layer of floating product?

The RI must include a map which shows the known extent of the floating product and the measured thickness of the product. Such information has been presented to the NJDEP such as the January 18, 1989 GeoEngineering, Inc. memo to NJDEP concerning the progress of the floating product recovery system.

2) Recovery of Floating Product/Progress Reports

A major effort should be launched immediately to recover the product that is floating on top of the groundwater at the site. The use of only one product skimmer at the site operating at very low recovery rates is not an expedient solution to recover the significant amount of floating product at the site. The NJDEP notified the owners of L.E. Carpenter, in February 1989, that their rate of product removal was insufficient and that a better plan would be required. Although I have not seen the proposals for an improved system, I am concerned, that because the extent



on the floating product has been grossly underestimated in the progress reports submitted to NJDEP, any recommended system may be inadequate. The progress report maps which show the extent of floating product ignore that fact that floating product is present at monitor well #1 and the large area of buildings 12, 13, 14 and the tank farm area for which there is little to no information on the presence or absence of floating product. The past interpretations of the extent of floating product and of shallow groundwater contamination also largely ignore the soil gas survey results which indicate that floating product and/or shallow groundwater contamination is much more extensive than the current RI indicates.

Based on the contaminants found in groundwater the floating product may consist primarily of ethyl-benzene and xylenes which are, fortunately for the most part, insoluble in water. However, if other contaminants are introduced to the groundwater in the future, either by on-site spills or by the migration of off site contaminant plumes, these contaminants could act as co-solvents which serve to increase the solubility of ethyl-benzene and xylene, thereby creating a much more serious groundwater contamination problem.

3) The Remedial Investigation lacks maps that show where the site is located in the state of New Jersey or in Wharton County. Not a single topographic map has been provided as part of the RI. This lack of topographic, geographic and demographic information makes it difficult to evaluate the RI and to adequately assess how surface topography may have controlled the introduction of contaminants to the subsurface or to surface waters. In addition to an accurate topographic map, a map should be provided showing the relative location of the site to the Wharton municipal water supply wells, located 2600 feet from the site, as well as nearby residential areas. Such information is essential in selecting an appropriate remedy and/or the degree of monitoring that will be required to adequately protect residents in the vicinity of the site.

4) The map of the extent of shallow groundwater volatile organic contamination (RI Figure 20) shows little relationship to the soil gas survey results which suggest that groundwater contamination/floating product is much more extensive than indicated in the RI. Numerous inconsistencies exist in the construction of the shallow groundwater contamination map. For example, Monitor Well 11-s encountered a minimum of ten feet of floating product however this well is shown as being located outside of the area of shallow groundwater contamination. Clearly this is an impossibility. Another example is the fact that volatile organic testing of test pit samples taken in and around the tank farm area showed concentrations of up to

1,857,000 ppb. Considering that groundwater is present only a few feet below, it is inappropriate to show the tank farm area, a likely contaminant source area, as being located outside the area of shallow groundwater contamination. The shallow groundwater contamination map appears to have been constructed using only the available groundwater analyses and did not include soil gas survey results, probable source areas and field observations of floating product. These maps are therefore inappropriate for use in the selection of a remedy for the groundwater contamination at this site because they underestimate the extent of the groundwater contamination problem.

5) The sources of the groundwater contamination problems have not been identified. This should be an essential component of the RI. If source areas such as contaminated soils, leaking storage tanks, etc., are not identified, contaminants will continue to migrate into the groundwater system. The RI must identify these potential source areas and provide the data necessary to determine if remediation of these areas is needed in order to prevent additional groundwater contamination. For example, what is the source of the floating product and groundwater contamination at Monitor Well #1? Considering that shallow groundwater flows north/northeast, the source area got the groundwater contamination detected at monitor well #1 should be located in the direction of Building 2, Building 16 or the railroad right of way. The RI should attempt to identify how such large quantities of xylene and ethyl-benzene were introduced into the groundwater system. What chemicals were stored in the various tanks on-site? Were these tanks ever tested for leaks by NJDEP? If so, what were the results? Are all the storage tanks empty or do they still contain chemical products? The last column of Table 1 of the RI does not clearly indicate if these tanks have been removed from site or if they are no longer being used to store chemicals. Has this information been verified by NJDEP?

As previously stated, all forms of information should be utilized to develop a comprehensive interpretation of contaminant source areas and the extent of contaminant migration. The following field observations should be considered in developing such an interpretation: a sheen on water at test pits #25 and #26; floating product on water at test pits #16, #30, #37; drum found at test pit #72; rusted, broken drum found at TP-4; subsurface lime green staining at TP-75; green powdery substance and rusted drum at TP-5.

6) The nature and extent of the former impoundment area has not been adequately defined. The RI should define the boundaries of this lagoon. Test pit and soil sampling results should be used to document whether or not the soil in this area requires

remediation.

Did the impoundment area have overflow pipes to the river? How did the significant levels of contaminants get into the river given the fact that groundwater does not flow towards the river?

7) The methods and equipment used to determine groundwater elevations should be stated in the RI. All raw data measurements should be provided in the appendices before they have been corrected to mean sea level depths. The surveyed elevations of top of well casing or other relevant measurement marks should be provided along with the surveyed locations of the wells. The surface elevation of each well location should also be provided. Until this information has been provided it will be difficult to confirm the piezometric interpretations that have been presented in the RI.

8) The conclusion that volatile organic contamination is not leaving the site is not well supported by the existing data. The RI does not provide an approximate rate of groundwater flow, one of the most basic elements of any RI hydrogeologic interpretation. Furthermore, the groundwater level maps do not indicate how many wells were used in developing these maps or the actual water level measurements on which the contours are based. In short, the maps are poorly documented. Given the fact that groundwater flows away from the river and that extremely high concentrations of contaminants are present in groundwater at the site, it would seem that contaminants would most likely migrate offsite unless there were some mitigating factors. If there are such factors they should be stated. The lack of contaminants in monitor well clusters 13 and 14 does not mean that no contamination is leaving the site. Given the relatively low gradient of groundwater at the site, groundwater flow could be in a more northerly direction than suggested in the RI.

9) Extent of Shallow Groundwater Contamination - The RI indicates that there are two separate areas of shallow groundwater contamination on site (RI Figure 20). However, because there are no monitor wells between these two indicated areas of shallow groundwater contamination and the fact that the tank farm, one of the most likely sources of this contamination, is located between these two areas, it is more likely that floating product extends at least from Monitor Well 1 to Monitor Well 3

10) Excessive Well Screen Lengths - Monitor wells one through 10 have screen lengths between 20 to 30 feet long. EPA recommends

that screen lengths of no more than 10 feet be utilized for monitor wells because longer screen lengths allow the dilution of contaminated groundwater by clean water from uncontaminated portions of an aquifer. This is especially relevant to sites such as L.E. Carpenter where contaminants are concentrated at the top of the water table.

11) A summary of sampling and QA problems should be provided in the text. It is stated in the appendices that a number of volatile organic samples exceeded their holding times. However, the sample numbers are not provided. It should be stated in the text which samples were possibly effected by the exceeded holding times and therefore may have yielded lower than true volatile organic levels. The tables of sample analyses should indicate which analyses exceeded holding times.

Page Specific Comments

Page 14, Second to last paragraph - Piezometer GEI-2s is not screened across the water table as stated. Figure 16 shows that the shallow groundwater table greater than 628.2 ft above sea level. The top of GEI-2s screened interval is at 627.67 feet. Therefore, the well is screened below the water table. The screened intervals for the shallow wells 13-s, 14-s and 16-s also do not intersect the water table and therefore cannot reliably be used to monitor floating product.

Page 16, First paragraph - PID/HNU values should be annotated on the boring logs provided in Appendix C. These values would provide important additional information regarding the vertical extent of site-related contamination.

Page 16, last paragraph - It is stated that where floating product was suspected a large diameter casing was installed below the water table and the floating product then flushed from within the casing prior to drilling deeper. At which wells was this procedure carried out and at which wells was floating product indeed encountered? This information should be clearly presented in the RI.

Page 17, Piezometer construction - PVC materials should not be used for any purposes at this site. PVC reacts with methylene chloride, naphtha and xylene. Xylene is apparently present as a pure phase floating product at the site and therefore its use at

this site is inappropriate.

Page 21, Aquifer Testing - The statement that the monitor wells cannot be used as efficient observation points due to their locations and depths should be removed. There is no apparent reason why these monitor wells could not be used. Also the statement that a pumping test could not be conducted because a large diameter well was needed should be deleted. The four inch diameter wells would probably be sufficient to conduct a low yield pumping test if one was determined to be necessary.

Page 36, TPH Analysis of Floating product at MW-11s - The complete analysis of this sample should be presented. It is essential to the selection of an appropriate remedy for this site that the nature of the floating product be clearly understood.

Page 43, Air Sampling - No mention is made of the levels of benzene that were detected at the site during the summer months (Appendix F). Does OSHA have limits for air for benzene?

Page 45, Geologic Cross Sections - The two cross sections have not been carefully constructed. There are numerous inconsistencies between cross sections A and B concerning the depths of wells that are shown on both cross sections, the depths to various geologic units and the figures that show the construction details of the wells. I will cite a few of the discrepancies to illustrate the need to completely redo these cross sections:

a) The bottom of MW-17-d on Cross Section "A" is at an elevation of 565 feet above msl. However, Figure 9 indicates that its bottom elevation is 584 feet above msl. Furthermore, the well log description provided in the appendices does not indicate that this well penetrated three distinct geologic units as shown. Only two geologic units are identified on the well log for this well. These cross sections must honor the data on which they are based upon.

b) The projection of MW-11-d over 350 feet to the line of cross section "A-A'" is not an acceptable method of cross section construction as it presents a misleading concept of subsurface conditions (i.e., bedrock topography).

c) MW-1 is shown as penetrating the unconsolidated sand and gravel unit with a total depth of approx. 592 feet on Cross Section "A". However, on Cross Section "B" MW-1 is not shown to be penetrating the sand and gravel unit and is not as deep.

d) The depth at which MW-11d is shown to encounter bedrock is different on Cross Sections "A" and "B".

It is not clear why it was decided not to draw the cross section lines from well to well, in segments, so that the cross sections would reflect the known subsurface conditions for particular locations. The method of projecting well information across large distances to the line of cross section produces an unreliable cross section.

Page 45 - General Geology - This section must reference appropriate USGS, State of New Jersey or other geologic investigations, local or regional, that relate to the subsurface conditions of this site. No attempt has been made to identify the major stratigraphic formations or recognized hydrogeologic units at the site.

Page 46 - Bedrock morphology - Three bedrock wells are insufficient to be able to describe the bedrock morphology as resembling "a trough like valley...that trends east southeast. If this statement is based on other information, or other regional geologic studies or interpretations, then this information should be referenced. If no such information is available, then the "trough like valley" theory should be presented for what it is, a theory, and not fact.

Page 46 - Type of Bedrock - The description of bedrock should be more complete: Pink, tan and gray, medium to coarse grained granite with frequent oxidized, near horizontal to vertical fractures.

Page 46 - Last paragraph - How were water levels measured? Where is this data presented?